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The Recent History of Destructive Forest Insect Activity in Alaska 1/

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An understanding of present and future problems in any field is usually aided by a knowledge of what has transpired in the past. Destructive forest insect pests in Alaska undoubtedly have a long past, probably dating back to the beginning of the forests. However, all but the most recent segment of this past has been lost to us.

Early Russian expeditions to Alaska made collections of insects, as did many of the expeditions that followed. These collections included some of the more destructive forest insects that are now known to occur in Alaska, but served as little more than a record of their occurrence.

The first destructive outbreak of forest insects that we have a definite record of had its beginning only forty years ago. From 1917 until 1921 an outbreak of the black-headed budworm, Acleris variana (Fern.) occurred over most of Southeast Alaska. A sawfly, presumably the hemlock sawfly, Neodiprion tsugae Midd., was also reported as being in outbreak status during this same period. The combined effect of these two insect outbreaks was described by A. J. Jaenicke in 1929 as causing the killing of considerable quantities of western hemlock with but slight injury to Sitka spruce over many portions of the Tongass National Forest. In 1927 an abnormal amount of dead and dying western hemlock was reported in Dry Pass and El Capitan Passage on the west side of Prince of Wales Island. This condition had apparently existed for two or three years prior to 1927. This area was a part of the black-headed budworm outbreak of 1917 to 1921. Damage and insect specimens from the Dry Pass area were forwarded to A. J. Jaenicke for identification. Jaenicke identified the insect responsible for the damage as the western hemlock borer, Melanophila fulvoguttata (Harr.) and wrote as follows:....."I am of the opinion that the borer damage..... had its beginning soon after the tremendous defoliations of western hemlock in 1917, 1918, and 1919.... The affected western hemlock which did not die within a year or so after the last defoliation struggled along with dead tops or with a badly thinned crown. It is in this weakened timber that the western hemlock borer finally got a foothold, increased in numbers and became destructive...."

1/ This paper was presented at the Alaska Science Conference, Anchorage, Alaska, September 10-13, 1957.

The western hemlock borer apparently caused the death of weakened or partially killed western hemlock in several areas of Southeastern Alaska in the mid-1920's, died out by 1928 and has not been reported as a serious problem since.

An infestation on the Chugach National Forest in 1925 was identified from submitted specimens as caused by the black-headed budworm, A. variana. Nothing more is known of this infestation. It is quite likely that it was a northern extension of the earlier outbreak in Southeast Alaska.

In 1922 F. H. Moffit of the U. S. Geological Survey reported widespread killing of white spruce in the area between Chitina and McCarthy, along the Copper and Chitina Rivers. Little is known of the cause or duration of this outbreak; however, it has definitely been established that the Alaska spruce beetle, Dendroctonus borealis Hopk. was the responsible insect pest. This infestation probably started around 1920 and subsided about 1930, although neither of these dates are known to be written fact. A considerable number of dead white spruce stand to this day. Recent aerial examinations of the Copper River country have been made and the insect-caused losses of the 1920's mapped from the air. Approximately 200,000 acres were involved in the outbreak which occurred in one of the better old-growth white spruce stands in Alaska. Losses varied from scattered individual trees and groups of trees to large areas of almost complete devastation.

In 1932 R. F. Taylor, during the course of extensive travels in Southeast Alaska, mapped areas of hemlock defoliation on the south half of Admiralty Island, the northwest tip of Kupreanof Island, at Dry Pass, the south end of Cleveland Peninsula and the west side of Revillagigedo Island. Material collected by Taylor from these various areas was identified as an undescribed new species closely related to Neodiprion abietis (Harr.). In 1933 similar sawfly specimens from Alaska were described as a new species, N. tsugae Midd., the hemlock sawfly as it has since come to be known.

A general increase in the activities of the Sitka spruce beetle, Dendroctonus obesus (Mann.), was reported in 1932. Sitka spruce were reported dying at an increased rate throughout the Tongass and Chugach National Forests, including the Kodiak-Afognak Island area. Apparently this increase in Sitka spruce beetle populations was of short duration in most areas except on Kodiak and Afognak Islands. Here the beetle reached outbreak proportions and was still reported active as late as 1939.

In 1933 several minor insects were reported because of their local interest. These included Neomyzaphis abietina (Wlkr.) and Zeiraphera, probably ratzeburgiana Sax., both found damaging Sitka spruce buds at Cordova. Chermes cooleyi Gill. was reported infesting western hemlock and Sitka spruce at Skagway in 1933 and was also reported as defoliating Sitka spruce on the Chugach National Forest in 1939. It causes small white tufts on the needles and sometimes causes galls to form on the tips of the new growth of Sitka spruce but is usually of little consequence.

Forest insect pests were not reported as being abundant during the late 1930's. Reports and correspondence during this period make but brief mention of insect-caused damage.

In 1940 a 225-acre outbreak in white spruce was reported near Fairbanks. The insect responsible for the outbreak was identified as Ips pertabatus (Eichh.), a spruce engraver beetle. No mention is made of the possible cause of the infestation but it is known that damage occurred over at least a five-year period and caused a 25-35 percent loss of the trees in the stand. Losses were reported as distributed throughout the range of tree crown classes.

An infestation of considerable magnitude occurred along the Haines Cut-off Highway during the 1940's and, although it did not extend into Alaska to any extent, it is worthy of mention. The Alaska spruce beetle, D. borealis, caused up to an estimated fifty percent loss of white spruce over an area extending from near the Alaska-British Columbia border on the Haines Cutoff Highway, and following the Upper Dezadeash River, to Mile 974 on the Alaska Highway. This infestation lasted from the early 1940's until about 1950. Cause of the outbreak is not known.

In 1941 or 1942 an infestation of the Sitka spruce beetle, D. obesus, began in mature to overmature Sitka spruce on Kosciusko Island. This stand of timber was considered by many to be the finest spruce stand in Southeast Alaska. The infestation lasted until 1948. Entomologist R. L. Furniss was detailed to the Alaska Region in 1946 to aid in an evaluation of the outbreak. A loss cruise in 1946 indicated that 29 percent of the merchantable spruce within the 6400-acre infestation area had been killed. Plans were made to salvage log some of the insect-killed trees but very little of this material was actually logged. Most of the dead trees remain standing today.

In 1947 or possibly 1946 the black-headed budworm and, to a lesser degree, the hemlock sawfly began developing in outbreak numbers in hemlock on the Tongass National Forest. This infestation increased in size and progressed through the entire Tongass and Chugach National Forests before subsiding in 1955. This outbreak was apparently very similar to the large-scale black-headed budworm and hemlock sawfly infestation of 1917 to 1921. In 1952 W. F. McCambridge was permanently assigned as entomologist in the Alaska Region. He carried on studies and surveys of the outbreak and worked out many of the details of the life history and habits of the black-headed budworm. The black-headed budworm preceeded the hemlock sawfly in most areas and was much more numerous. It was considered to be the more damaging of the two species involved. The work on the black-headed budworm represents the only intensive study of any forest insect pest in Alaska and is well documented by several reports prepared by McCambridge. The author was assigned to the Alaska Region in 1956 and since that time has carried on small-scale surveys to determine the amount of permanent hemlock damage resulting from the 1947 through 1955 outbreak. Incomplete results indicate over 100,000 acres of moderate to heavy top-killing and complete tree-killing. This permanent damage varies from about ten percent of the total stand on moderately damaged areas to well over fifty percent of the stand on the more heavily hit

areas. Light scattered top-killing occurred over a much larger area. In a few areas the insect-killed trees have been salvaged as part of the regular logging operation.

Prior to 1948 and continuing through the early 1950's, an outbreak of the Alaska spruce beetle caused extensive damage to the white spruce stands along the south side of Knik Arm, near Anchorage, and extended up the Matanuska River almost to Matanuska Glacier. Again the cause of the infestation and the reasons for its decline are not known. Tree losses in the more heavily damaged portions of the infestation area are estimated at well over fifty percent of the stand.

The spruce budworm, Choristoneura fumiferana (Clem.), a serious pest throughout most of Canada and the United States, was noted causing the defoliation of Sitka spruce in the vicinity of Haines from 1948 to 1950. No permanent damage from this defoliation was reported.

Ips interpunctus (Eichh.), a spruce engraver beetle, is responsible for an infestation covering over a million acres of white spruce in the vicinity of the Chandalar, Sheenjek, Coleen, and Porcupine Rivers. This infestation is believed to have started about 1950 and is presently active, but tree losses are now confined to a few widely scattered locations.

Two small outbreaks of the Sitka spruce beetle are currently active. At Port Bazaan on Dall Island a million and one-half board feet of Sitka spruce are estimated to have died as a result of an infestation that has been in existence since before 1950. Losses here are now at a low level. The other current outbreak of the Sitka spruce beetle is located at Blackstone Bay near Whittier. This infestation has been active since about 1952 and now covers an area roughly twelve miles long and one-quarter of a mile wide. Some of the losses in these areas may be salvaged through regular logging operations.

Since 1952 a forest entomologist has been permanently assigned to the Alaska Forest Research Center to carry on detection and appraisal surveys of forest insect-caused damage in Alaska. Detection of forest insect-caused damage has been materially aided by a cooperative detection reporting system. Under this system forest land owners and managers throughout Alaska are requested to submit reports of unusual forest insect activity to the Alaska Forest Research Center in Juneau. Annual aerial surveys are conducted to aid in the detection of new forest insect outbreaks and to assist in the evaluation of reported or previously known outbreaks. These aerial inspections are usually followed by on-the-ground appraisals of the more important insect activity centers.

This brief summary of insect pests and their damage to Alaskan forests undoubtedly fails to include some of the more important forest insects which may have been epidemic in years gone by and that are likely to make their destructive presence known in the years to come.

Note: This is Forest Insect Survey Report No. 1, the first of a new series. Previous reports concerning surveys of forest insects have appeared unnumbered under various titles.